Space Weather Forecast

Issued on Sunday, 25 February 2024 at 01:24 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Moderate flares expected with a chance of Strong flares and slight chance of associated solar radiation storms. Chance of G1/Minor geomagnetic storm mainly on day 1 (25 Feb).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate flares were observed from the large spot in the north-centre disc, which was the source of three Strong flares on 21-22 Feb. There are five numbered spots, however this region remains the largest by far, with a complex magnetic structure. The other regions are much smaller and simpler, with no significant growth observed.

There were no Earth directed coronal mass ejections (CMEs) observed in available imagery.

Solar Wind / Geomagnetic Activity: Solar wind speeds were at background levels throughout. There were signs of a weak CME arrival from 24/1617UTC however, with an increase in speed briefly up to 400km/s and Total Interplanetary Magnetic field (IMF) strength, which was weak, increasing to moderate. The important north-south component varied weakly.

Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was very slightly above background due to the lingering effects of the previous enhancements that started on 09 Feb. However this remained well below the S1 Minor Solar Radiation Storm level.

Four-Day Space Weather Forecast Summary

Solar Activity: Activity is forecast to remain Moderate to High, with occasional Moderate class flares expected and a chance of further isolated Strong class flares from the large sunspot in the north-centre disc.

Solar Wind / Geomagnetic Activity: Background solar winds are likely to become enhanced on day 1 (25 Feb), from the onset of the fast wind from a coronal hole, before peaking into day 2 (26 Feb). These fast winds easing day 3 (27 Feb). Quiet activity at first becoming Unsettled to Active with a slight chance of G1 Minor Storms from coronal hole fast wind onset on day 1/2 (25-26 Feb). Quiet to Unsettled activity returning day 3 (27 Feb).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to continue easing towards background, but with a chance of becoming re-enhanced due to any significant flares from the large sunspot on the disc, increasing as the region moves into the western hemisphere.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	20	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	70	60
Very Active	R3 to R5 X	No	20	20	20	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	20	20
Very Active	≥ S3 *	No	1	1	5	5
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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